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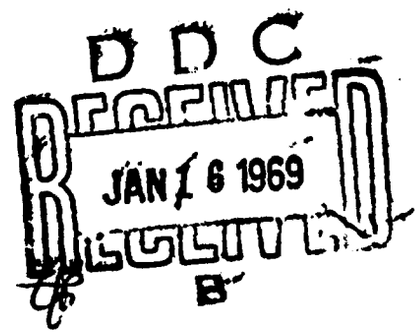

DEPARTMENT OF THE ARMY
Fort Detrick
Frederick, Maryland

#261

The viruses of equine encephalomyelitides (types West, East and Venezuela).

by W. Kloene.

Handbuch der Virusforschung, 4 (supplement III): 266-268 (1958), Vienna.

Zinsser and Schoenbach (357) as well as Sanders and Molloy (266) grew the West type of the virus of equine encephalomyelitis in cultures of chick embryo tissues prepared according to the Maitland method. The former authors noted that the metabolic activity of the tissue culture cells diminished in the process of virus multiplication. Morphological examinations of infected tissue culture cells were conducted by Huang (130, 133), who also used chick embryo tissue. Infected tissue fragments maintained in the Maitland type of tissue culture, did not show fibroblastic growth upon subsequent transfer to hanging drop plasma cultures, in contrast to non-infected control cultures. At the same time Huang demonstrated that the multiplication of virus in tissue culture cells is prevented if the virus suspension used for the infection of the cultures is first mixed with specific immune serum. Fastier (80) also noted a strong cytopathogenic effect of the West type virus in cultures of chick embryo tissue.

Smith and Evans (298) grew the West type virus in roll-cultures of monkey testicular fibroblasts. In this type of cell also, a complete destruction of cells due to virus propagation could be observed: All cells within the growth zone of the explants became round and showed pycnotic nuclei. Scherer and Sylverton (279) also observed a pronounced cytopathogenic effect upon the infection of HeLa cell cultures both with the West type and the East type of the virus.

Based on the fact that the West type virus has a cytopathogenic effect on cultures of chick embryo tissues, Dulbecco and Vogt (54) were able to conduct investigations of the course of virus propagation in fibroblasts by means of the "plaque" technique developed by the authors. After adsorption of the virus particles and a latent period of 2-3½ hours, an exponential rise in the virus concentration was noted initially; subsequently the curve of virus multiplication was less steep, until a constant maximal value was reached after 6-8 hours. With the exception of the liberation of newly formed virus particles, amounting to 200-1,000 particles per infected cell and extending over several hours, the cycle of reproduction corresponded to that of bacteriophages. Rubin et al. (253) who also used the technique developed by Dulbecco, similarly found that one hour after adsorption of virus particles to the cells, no infectious virus could be demonstrated within the cell. Newly formed infectious virus particles were found only 1-2 hours after infection.

Bang and Gey (5) investigated the behavior of thirteen strains of rat fibroblasts maintained in continuous passages, toward infection with

East type virus. These tests show the great diversity of the individual strains of tissue culture in respect to their susceptibility to the virus, even between a normal line (14 p) and its malignant counterpart (T-333) produced in vitro. Between tissue culture strains that evidenced a complete destruction of cells due to virus propagation (e.g. T-333) and those that were not at all susceptible to infection (e.g. 14 p), there were cellular strains that showed injury to only a small part of the available cells and correspondingly scant virus multiplication. In such cell strains, moderate virus propagation and growth of the tissue culture was demonstrated simultaneously; thus, infected cultures could be passed for more than 4 months without renewed infection or addition of cells. A balance was present here between virus reproduction and cell growth; no change was noted in the virus strain's virulence with respect to adaptation in the sense of increased cell destruction.

The Venezuela type of the virus of equine encephalomyelitis was grown in cultures of chick embryo tissues by Lennette and Koprowski (171) and in cultures of human uterine tissue by Gajdusek et al. (98). The authors used the Maitland type of tissue culture, and their findings agree in the circumstance that their tissue cultures are less sensitive to the demonstration of virus than the mouse test. In the case of continual passages of the virus strain in tissue culture, an attenuation of the virus was recognized upon the peripheral infection of mice (157).

Huang (131) noted an interference between the virus of St. Louis encephalitis and the West type virus of equine encephalomyelitis in cultures of chick embryo tissues. Taylor (320) found an interference between influenza A virus and the West and East types of the virus of equine encephalomyelitis in cultures of the chorioallantoic membrane of the incubated chicken egg.

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